In the Claims

1. (currently amended) A link assembly for a robot arm which assembly comprises:

first and second link members each adapted for limited movement one with respect to the other; ~~and~~

a resilient elastomer ~~means~~ disposed between said first and second members;

at least one wire extending from said first link member to said second link member controlling the movement of said first and second link members, said at least one wire including a preload so as to maintain said link assembly under compression;

characterized in that the first and second members are configured in a cooperating mating relationship and the elastomer ~~means~~ is disposed between them as a layer and the elastomer ~~means~~ is keyed or bonded to both of the first and second link members whereby the layer is sufficiently thin and is maintained under compression by said at least one wire such that a bending movement between the members produces shear movement within the elastomer ~~means~~ and substantially no compressive movement as a result of the relative movement between the said first and said second members.

2. (original) A link assembly as claimed in claim 1 wherein the elastomer is a natural or synthetic rubber.

3. (cancelled)

4. (previously presented) A link assembly as claimed in claim 1 wherein the thickness of the layer is 3 mm or less.

5. (cancelled)

6. (previously presented) A link assembly as claimed in claim 1 wherein each surface of the elastomeric layer contiguous the member is effectively secured so that in operation, relative movement between the members produces shear movement within the elastomer, the arrangement being such that the thinness of the layer reduces the tendency towards compression thereby imparting improved stability for the positioning of the components.

7. (previously presented) A link assembly as claimed in claim 1 wherein the elastomer means comprises a plurality of layers of elastomer.

8. (previously presented) A link assembly as claimed in claim 7 wherein an interleaving rigid layer is bonded or keyed to adjacent elastomer layers to separate one layer from its neighbor.

9. (previously presented) A link assembly as claimed in claim 1 wherein the elastomer means is a laminate.

10. (previously presented) A link assembly as claimed in claim 8 wherein the interleaving layer between each layer of elastomer is of a material, which is bondable to or capable of being keyed to the elastomer.

11. (previously presented) An assembly as claimed in claim 10 characterized in that the interleaving layer is sufficiently stiff to reduce compression of the elastomer to a minimum during movement of the linked members.

12. (previously presented) An assembly as claimed in claim 8 wherein the interleaving layer comprises a metal layer, a resin or glass fiber, or a mat of either woven or unwoven material.

13. (previously presented) An assembly as claimed in claim 12 wherein the woven or unwoven material comprises carbon fiber or Kevlar.

14. (cancelled)

15. (previously presented) A robotic arm comprising a segment having a plurality of link assemblies as claimed in claim 1 and <u>said at least one wire comprises</u> control means for controlling the movement of said link assemblies within the segment ~~wherein the control means maintains said link assemblies under tension or compression~~.

16. (cancelled)

17. (currently amended) A robotic arm as claimed in claim ~~16~~ 15 wherein the control means comprises three wires each extending from one end of the segment to the other whereby changing the tension in the wires one relative to the other causes or allows the links to flex thereby controlling movement of the segment.

18. (previously presented) A robotic arm as claimed in claim 17 wherein the wires are tensioned to maintain the links under compression, the arrangement being such that application of differential tension between the wires causes or allows the segment to move or bend.

19. (previously presented) A robotic arm as claimed in claim 15 wherein, in each link assembly, the first link member comprises an outer disc having holes for control wires so that the control wires extend externally of the other components of the link assembly, and the second link member comprises an inner disc which is adapted to be disposed generally inwardly of the outer disc and which has a central bore to accommodate at least one of control and power means for the work head and a rubber disc or layer extending between each inner and outer disc which is bonded or keyed to each, but which is otherwise free-floating between said inner disc and outer disc so that the inner disc is not directly constrained by other components of the assembly.

20. (previously presented) A robotic arm as claimed in claim 15 comprising a plurality of said segments in which control means is provided for each segment.

21. (original) A robotic arm as claimed in claim 20 wherein each segment terminates in an end cap having wire conduit means for the control wires of other segments of the arm and anchorage means arcuately spaced about the cap for securing the control wires for the segment in question.

22. (previously presented) A robotic arm as claimed in claim 15 wherein at least one of the members of each link is provided with means for guiding the wires from one end of the segment to the other.

23. (previously presented) A robotic arm as claimed in claim 15 wherein each wire is disposed externally of the segment links and terminates in a ferrule which is adapted to engage with a corresponding recess in the end cap of a segment so that on tensioning the wires, the ferrule is brought into engagement with the end cap to exert a compressive load on each of the links to maintain the stiffness of the links within the segment.

24. (previously presented) A robotic arm as claimed in claim 20 characterized in that each control wire is operated by an actuator and wherein the actuators associated with each control wire are spaced in one or more arcs about a headboard contiguous one

end of the first segment.

25. (previously presented) A robotic arm as claimed in claim 24 wherein the actuator array provides one actuator for each wire to be disposed in a spaced arcuate relationship to define a frustocone, further characterized in that the wire from each actuator is passed about a guide or pulley to provide a fair lead for the control wire from the actuator to the entry into the segment.

26. (previously presented) An assembly as claimed in claim 1 wherein each link is produced as a pair of half links which permit back to back assembly, the arrangement being such that an inner link and an outer link halves may be assembled with its associated bonding layer to form unitary link components, a plurality of which together can be assembled to form a segment.

27. (cancelled)

28. (currently amended) An assembly or arm as claimed in claim ~~27~~ 26 wherein each of the half links can be located by means of locating dowels provided in mating holes on each of the assembled half-links whereby the assembly can be produced without further connection between the half-linked components and cables can be threaded through the various operating holes in the outer link periphery coupled to the actuator board, the arrangement being such that the actuators can be activated to produce a degree of

tension in the board and in the cables whereby the whole assembly is held together so that by varying the tension in the wires, the segment can be manipulated as appropriate.

29. (previously presented) An arm as claimed in claim 15 characterized by an external sleeve provided about each segment.

30. (previously presented) An arm as claimed in claim 15 wherein the sleeve is a bellows-type sheath.

31. (previously presented) An arm as claimed in claim 15 wherein the sheath comprises a material and a configuration which are selected to increase the tortional stiffness of the arm.

32. (previously presented) An arm as claimed in claim 29 wherein the sheathed segment is filled with a lubricant.

33. (previously presented) An arm as claimed in claim 32 wherein the lubricant is either a dry powder or a liquid such as grease and/or oil and wherein the physical characteristics of the lubricant incorporated in the arm are selected according to the environment in which the arm is to operate.

34. (previously presented) An arm as claimed in claim 31 wherein the arm is provided with a lubricant reservoir and means for pumping lubricant through the arm and recycled back to the reservoir.

35. (original) An arm as claimed in claim 34 wherein lubricant cooling means are provided for cooling the arm when used in an aggressive environment.

36. (currently amended) A link assembly for a robot arm comprising:

first, second, and third link members having respectively adjacent spherical surfaces formed to fit together in a nesting relationship;

at least one wire extending from said first link member to said third link member controlling the movement of said first and third link members, said at least one wire including a preload so as to maintain said link assembly under compression;

said second link member comprising an elastomeric material disposed between said first and third link members;

said adjacent spherical surfaces of said first, second, and third link members being keyed or bonded to one another such that during articulation of the arm said third link rotates about a point of rotation relative to said first link and the distances between the ~~adjacent surfaces~~ spherical surfaces of said first and third links remains substantially constant;

said elastomeric material maintained under compression by said at least one wire such that substantially no compressive deformation of said elastomeric material

occurs during rotation of said third link about the point of rotation relative to said first link; and

said elastomer material permitting shear deformation of said elastomer material during articulation of the assembly~~; and~~

~~said elastomer material substantially preventing compressive deformation of said elastomer material during articulation of the assembly~~.